## AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application:

1. (currently amended) A composition comprising:

a mixture ~~combination~~ of a first refinery feedstock and a second refinery feedstock,

wherein the fraction of the second refinery feedstock in the mixture ~~combination~~ is at least in part a function of respective quantities of an alpha fraction and a beta fraction of total naphthenic acids in the first refinery feedstock,

wherein the fraction of the second refinery feedstock in the mixture ~~combination~~ is at least in part a function of the beta fraction of total naphthenic acids in the second refinery feedstock, and

wherein the naphthenic acids in the alpha fraction are characterized by at least two of (a) a molecular weight of between 125 to 425, (b) a true boiling point of less than 725 °F, (c) a solubility in water at a pH of 6 to 9 between 0.1-2.5 mg/liter, and (d) a solubility of iron naphthenates in oil formed from the naphthenic acids of $< 0.1$ mg/liter;

wherein the naphthenic acids in the beta fraction are characterized by at least two of (a) a molecular weight of between 325 to 900, (b) a true boiling point of between 725 °F and 1500 °F, (c) a solubility in water at a pH of 6 to 9 between 0.0-0.3 mg/liter, and (d) a solubility of iron naphthenates in oil formed from the naphthenic acids of $> 0.08$ mg/liter; and

wherein the amount of the beta fraction of total naphthenic acids in the second refinery feedstock is effective to reduce naphthenic acid corrosivity of the first refinery feedstock.

2. (canceled)

3. (previously presented) The composition of claim 1 wherein the first refinery feedstock comprises a refinery feedstock crude with a total acid number of at least 0.3, and wherein the second refinery feedstock comprises a refinery crude having a total acid number of at least 2.0.

4. (currently amended) The composition of claim 1 wherein the second refinery feedstock is ~~prepared from a refinery crude using~~ <u>a</u> thermal hydroprocessing <u>product</u>.

5. (currently amended) A <u>mixture</u> ~~combination~~ of a refinery crude and a composition enriched in a beta fraction of naphthenic acids, <u>wherein the naphthenic acids in the beta fraction are characterized by at least two of (a) a molecular weight of between 325 to 900, (b) a true boiling point of between 725 °F and 1500 °F, (c) a solubility in water at a pH of 6 to 9 between 0.0-0.3 mg/liter, and (d) a solubility of iron naphthenates in oil formed from the naphthenic acids of > 0.08 mg/liter, and</u> wherein an amount of the enriched composition in the combination is an amount determined to be effective to reduce naphthenic acid corrosivity of the first refinery crude.

6. (currently amended) The combination of claim 5 wherein the composition is ~~prepared from a hydrocarbon crude by~~ <u>a</u> thermal hydroprocessing <u>product</u>.

7. (original) The combination of claim 5 wherein the composition has a total acid number of at least 2.5.

8. (original) The combination of claim 5 wherein the composition comprises at least 5 mol% naphthenic acids with an average molecular weight of at least 350.

9. (currently amended) A <u>method of forming a</u> mixture of a first refinery feedstock and a second refinery feedstock, <u>comprising: determining in</u> ~~wherein~~ the first feedstock ~~is determined to have~~ a specific quantity of alpha naphthenic acids, <u>and in</u> ~~wherein~~ the second feedstock ~~is determined to have~~ a specific quantity of beta naphthenic acids, and <u>adding</u> ~~wherein~~ the second feedstock ~~is added~~ to the mixture in an amount such that corrosivity of the mixture is reduced as compared to corrosivity of the first feedstock<u>, and wherein the naphthenic acids in the beta fraction are characterized by at least two of (a) a molecular weight of between 325 to 900, (b) a true boiling point of between 725 °F and 1500 °F, (c) a solubility in water at a pH of 6 to 9 between 0.0-0.3 mg/liter, and (d) a solubility of iron naphthenates in oil formed from the naphthenic acids of > 0.08 mg/liter</u>.

10. (withdrawn) A plant comprising:

a first feedstock supply providing a first feedstock, and a second feedstock supply providing a second feedstock;

at least one of a crude unit and a vacuum unit, each are configured to receive the first feedstock and the second feedstock; and

an instruction associated with at least one of the first and second feedstock supplies that provides information that the second feedstock is to be fed to the at least one of the crude unit and the vacuum unit in a predetermined amount that is effective to reduce naphthenic acid corrosion in the at least one of the crude unit and the vacuum unit as compared to naphthenic acid corrosion of the first feedstock without the second feedstock..

11. (withdrawn) The plant of claim 10 wherein the first and second feedstocks are combined before entering the at least one of the crude unit and the vacuum unit.

12. (withdrawn) The plant of claim 11 wherein the first and second feedstock supplies are a combined feedstock supply.

13. (withdrawn) A plant comprising:

at least one of a crude unit and a vacuum unit receiving a feedstock;

a separation unit that removes beta naphthenic acids from the feedstock; and

a recycling circuit fluidly coupled to the separation unit and the at least one of the crude unit and the separation unit, wherein the recycling circuit provides at least some of the beta naphthenic acids to the feedstock..

14. (withdrawn) The plant of claim 13 wherein the beta naphthenic acids are provided to the feedstock via the recycling circuit in an amount effective to reduce naphthenic acid corrosivity of the feedstock.

15. (withdrawn) The plant of claim 13 wherein the feedstock comprises opportunity crudes.

16. (withdrawn) A plant comprising:

at least one of a crude unit and a vacuum unit receiving a treated feedstock;

a hydrothermal treatment unit that receives a feedstock and removes at least a portion of alpha naphthenic acids from the feedstock to form the treated feedstock; and

an instruction that provides information that the alpha naphthenic acids are to be removed to achieve a predetermined alpha naphthenic acid to beta naphthenic acid ratio.

17. (withdrawn) The plant of claim 16 wherein the hydrothermal treatment comprises a hot extraction wash unit.

18. (currently amended) A method of operating a plant, comprising a step of determining a beta naphthenic acid content of a feed, <u>wherein the naphthenic acids in the beta fraction are characterized by at least two of (a) a molecular weight of between 325 to 900, (b) a true boiling point of between 725 °F and 1500 °F, (c) a solubility in water at a pH of 6 to 9 between 0.0-0.3 mg/liter, and (d) a solubility of iron naphthenates in oil formed from the naphthenic acids of > 0.08 mg/liter,</u> determining corrosivity of a hydrocarbon feedstock, and combining the feed with the hydrocarbon feedstock in an amount effective to reduce corrosivity of the hydrocarbon feedstock.

19. (original) The method of claim 18 wherein the feed comprises oil sand crudes.

20. (currently amended) A method of operating a plant, comprising:

determining naphthenic acid corrosivity of a first refinery feedstock, and determining content of a beta fraction of total naphthenic acids in a second refinery feedstock;

<u>wherein the naphthenic acids in the beta fraction are characterized by at least two of (a) a molecular weight of between 325 to 900, (b) a true boiling point of between 725 °F and 1500 °F, (c) a solubility in water at a pH of 6 to 9 between 0.0-0.3 mg/liter, and (d) a solubility of iron naphthenates in oil formed from the naphthenic acids of > 0.08 mg/liter;</u>

combining the first and second refinery feedstock to form a combined refinery feedstock having a combined naphthenic corrosivity; and

wherein the amount of the second refinery feedstock in the combined refinery feedstock is a function of the beta fraction of total naphthenic acids in the second refinery feedstock such that the combined naphthenic corrosivity is less than the naphthenic corrosivity of the first refinery feedstock.

21. (currently amended) The method of claim 20 wherein the step of determining naphthenic acid corrosivity of the first refinery feedstock comprises determination of an alpha fraction of naphthenic acids, wherein the naphthenic acids in the alpha fraction are characterized by at least two of (a) a molecular weight of between 125 to 425, (b) a true boiling point of less than 725 °F, (c) a solubility in water at a pH of 6 to 9 between 0.1-2.5 mg/liter, and (d) a solubility of iron naphthenates in oil formed from the naphthenic acids of < 0.1 mg/liter.

22. (original) The method of claim 20 wherein the second refinery feedstock comprises Athabasca oil sand crudes.

23. (currently amended) A method of operating a plant, comprising:
providing a refinery feedstock comprising a beta fraction of total naphthenic acids;
wherein the naphthenic acids in the beta fraction are characterized by at least two of (a) a molecular weight of between 325 to 900, (b) a true boiling point of between 725 °F and 1500 °F, (c) a solubility in water at a pH of 6 to 9 between 0.0-0.3 mg/liter, and (d) a solubility of iron naphthenates in oil formed from the naphthenic acids of > 0.08 mg/liter;
fractionating the refinery feedstock into at least one product fraction and a fraction comprising the beta fraction; and
combining at least a portion of the fraction comprising the beta fraction with the refinery feedstock in an amount effective to reduce naphthenic acid corrosivity.

24. (original) The method of claim 23 wherein the step of combining the portion of the fraction comprising the beta fraction with the refinery feedstock is performed using a recycle loop in the plant.

25. (original) The method of claim 23 wherein the feedstock is fed into at least one of a crude unit and a vacuum unit after the step of combining and before the step of fractionating.

26. (previously presented) A method of operating a plant, comprising a step of determining a total acid number of a feedstock, and a step of increasing the total acid number using a

beta fraction of naphthenic acids in an amount effective to reduce naphthenic acid corrosivity of the feedstock.

27. (previously presented) The method of claim 26 wherein the step of increasing the total acid number comprises combining a hydrocarbon composition enriched in the beta fraction of naphthenic acids with the feedstock.

28. (previously presented) The method of claim 26 wherein the step of increasing the total acid number comprises combining naphthenic acids having an average molecular weight of at least 350 with the feedstock.

29. (previously presented) A method of producing a hydrocarbon product, comprising:
identifying a resource as comprising a hydrocarbon feed, wherein the hydrocarbon feed was previously rejected for use as a feed to at least one of a crude unit and a vacuum unit due to naphthenic acid corrosivity;
determining a ratio of beta naphthenic acids to alpha naphthenic acids in the feed; and
processing the hydrocarbon feed such that the ratio of beta naphthenic acids in the feed to alpha naphthenic acids in the feed increases.

30. (original) The method of claim 29 wherein the step of processing comprises hydrothermal processing.

31. (original) The method of claim 29 wherein the resource comprises opportunity crudes.

32. (currently amended) A method of marketing, comprising determining a quantity of a beta fraction of total naphthenic acids in a refinery feedstock, <u>wherein the naphthenic acids in the beta fraction are characterized by at least two of (a) a molecular weight of between 325 to 900, (b) a true boiling point of between 725 °F and 1500 °F, (c) a solubility in water at a pH of 6 to 9 between 0.0-0.3 mg/liter, and (d) a solubility of iron naphthenates in oil formed from the naphthenic acids of > 0.08 mg/liter,</u> and providing information correlating the quantity of the beta fraction with reduced naphthenic acid corrosivity of the refinery feedstock.

33. (original) The method of claim 32 further comprising providing information of the quantity of the alpha fraction of total naphthenic acids in the refinery feedstock.

34. (withdrawn) A method of reducing naphthenic acid corrosivity of a feedstock in a plant comprising a step of adding an iron chelator to the feedstock, wherein the iron chelator binds to iron disposed in a metal surface that contacts the feedstock, and wherein the iron chelator does substantially not dissolve the iron into the feedstock.